

# PATENT ABSTRACTS OF JAPAN

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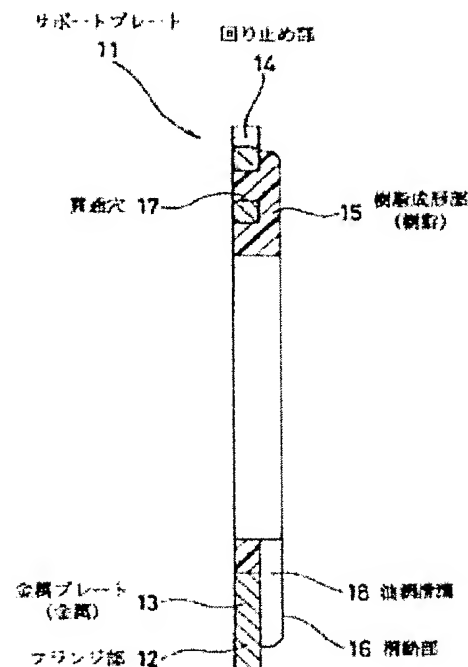
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## (54) SUPPORT PLATE FOR STATOR

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a support plate 11 for a stator capable of reducing an amount of deflection generated at the support plate 11 and thereby preventing increase of a rotational resistance or generation of abnormal abrasion caused by the deflection.

**SOLUTION:** This support plate 11 for a stator is installed on a stator body and rotatably supports a notch plate. A flange part 12 for receiving a load of the support plate 11 is made of a metal 13, and a resin 15 is integrally molded with the metal 13. An oil lubricating groove 18 required for slidably moving with a mating member is formed by the resin 15. On the inside diameter side, the resin 15 is continuously formed along the peripheral direction, and a resin layer or the resin layer and a metallic layer are formed along the thickness direction. A through hole 17 or a recessed and protruding part is formed on a surface of the metal 13. A part of the resin 15 intervenes in the through hole 17 or the recessed and protruding part.



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**CLAIMS**

[Claim(s)]

[Claim 1]In a support plate for stators (11) which is attached to a stator body and supports a notch plate pivotable, A flange (12) which receives load of the support plate (11) concerned is used as metal (13), An oil lubrication groove (18) required in order to carry out integral moulding of the resin (15) to said metal (13) and to slide with a mating member is formed by resin (15), As for the inside diameter side, resin (15) is constituted from a resin layer or a resin layer, and a metal layer by continuation and thickness direction in a hoop direction, A support plate for stators having composition which forms a through hole (17) or unevenness in the surface of said metal (13), and makes said some of resin (15) intervene in said through hole (17) or unevenness.

[Claim 2]In a support plate for stators (11) which is attached to a stator body and supports a notch plate pivotable, A support plate for stators having formed a mating member and a sliding part (16) which slides with resin (15) while forming a flange (12) which receives thrust loading at the time of an operation with metal (13), and carrying out integral moulding of said resin (15) to said metal (13).

[Claim 3]A support plate for stators establishing an oil lubrication groove (18) in the end face of a sliding part (16) formed with resin (15) radiately in a support plate for stators of Claim 2.

[Claim 4]A support plate for stators providing an oilway (20) which forms a breakthrough (19) penetrated to shaft orientations in metal (13) and resin (15) which are put on shaft orientations, and becomes them from said breakthrough (19) in Claim 1 or a support plate for stators of 2.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the stator used for the torque converter of the automatic transmission for cars, etc., and relates to the support plate which is one of component parts in more detail.

[0002]

[Description of the Prior Art]As shown in drawing 6, as a kind of the stator 1 used for the torque converter of the automatic transmission for cars, etc., Some are provided with the support plate 4 which is attached to the inside diameter side of the stator body 2, and supports the notch plate 3 pivotable between the stator bodies 2, and, as for this support plate 4, that whole is conventionally formed with resin.

[0003]However, since the rigidity may be insufficient when the support plate 4 is formed only with resin in this way, there is the following inconvenience.

[0004]Namely, although thrust loading which acts from the turbine or impeller side at the time of that operation is received in this support plate 4 in the end face 4b of the flange 4a dashed by the inside diameter step 2a of the stator body 2, On structure with a group, also when load acts on the sliding surface 4c of the support plate 4, this load will be received from the necessity of supporting the notch plate 3 pivotable in the end face 4b of the flange 4a. The sliding surfaces 4c are a mating member which is not illustrated and a portion which slides. Therefore, a flexure amount becomes large as load is added to 4 d of portions by the side of an inside diameter, the bending moment of 4 d of this inner diameter part becomes large and it dies to the inside diameter side as that result depending on thickness rather than the end face 4b of the flange 4a.

[0005]And if the flexure amount of 4 d of inner diameter parts of the support plate 4 becomes large in this way, If the stator body 2 races where it changed into the state where 4 d of this inner diameter part interferes with the notch plate 3, and thrust loading is added to the notch plate 3 and thrust loading is added to the notch side of the notch plate 3 in this way, The field slides and there is a possibility that the resistance at the time of idling may become large, or anomalous attrition may occur in an about six pocket section [ of the light-gage plate 5 inserted in the inside of the stator 1 or the stator body 2 ] resin part.

[0006]By one side, when the flexure amount of the support plate 4 is large, the mating part of the support plate 4 and the actual contact surface which slides become only the periphery side under the influence, and a possibility that it may become small, and may become coefficient-of-friction size and wear size, and it may become impossible to satisfy the sliding characteristic demanded also has a touch area.

[0007]

[Problem(s) to be Solved by the Invention]This invention can reduce the flexure amount generated in a support plate in view of the above point, and it has it, and aims at providing the support plate for stators which can prevent anomalous attrition from rotational resistance increasing or occurring by making this bending into a cause.

[0008]

[Means for Solving the Problem]In order to attain the above-mentioned purpose, a support plate by Claim 1 of this invention, In a support plate for stators which is attached to a stator body and supports a notch plate pivotable, Use as metal a flange which receives load of the support plate concerned, and integral moulding of the resin is carried out to said metal, Form an oil lubrication groove required in order to slide with a mating member by resin, and, as for the inside diameter side, resin follows a hoop direction, A resin layer or a resin layer, and a metal layer were consisted of by thickness direction, a through hole or unevenness was formed in the surface of said metal, and it had composition which makes said some of resin intervene in said through hole or unevenness.

[0009]A support plate by Claim 2 of this invention, In a support plate for stators which is attached to a stator body and supports a notch plate pivotable, While forming with metal a flange which receives thrust loading at the time of an operation, a mating member and a sliding part which slides were formed with resin, and integral moulding of said resin was carried out to said metal.

[0010]In the above-mentioned support plate for stators of Claim 2, a support plate by Claim 3 of this invention established an oil lubrication groove in the end face of a sliding part formed with resin radiately.

[0011]In above-mentioned Claim 1 or a support plate for stators of 2, a support plate by Claim 4 of this invention formed again a breakthrough penetrated to shaft orientations in metal and resin which are put on shaft orientations, and an oilway which consists of said breakthrough was provided.

[0012]Like a support plate by Claim 1 of this invention provided with the above-mentioned composition, If integral moulding of the resin is carried out to this metal by using as metal a flange which receives load of a support plate, it will become possible to reduce a flexure amount generated in a support plate according to the rigid increase by having used this metal.

[0013]Forming a through hole or unevenness on the surface of metal, and having made it make some resin intervene in this through hole or unevenness to a sake. It becomes possible to carry out the baffle of the resin firmly to metal, and since an oil lubrication groove required in order to slide with a mating member was formed by resin, it becomes possible to do so a lubrication action to a sliding part with an oil etc. which flow through this oil lubrication groove at the time of an operation.

[0014]While forming with metal a flange which receives thrust loading in a support plate by Claim 2 of this invention provided with the above-mentioned composition at the time of an operation, a mating member and a sliding part which slides are formed with resin, Since integral moulding of the resin was carried out to metal, it becomes possible to reduce a flexure amount generated in a support plate according to the rigid increase by having used metal too.

[0015]In addition, in a support plate by Claim 3 of this invention provided with the above-mentioned composition, Since an oil lubrication groove was radiately established in the end face of a sliding part formed with resin, In a support plate become possible to do so a lubrication action to a sliding part with an oil etc. which flow through this oil lubrication groove at the time of an operation, and according to Claim 4, Since an oilway which forms a breakthrough penetrated to shaft orientations in metal and resin which are put on shaft orientations, and becomes them from this breakthrough was provided, an oil etc. which flow through this oilway at the time of an operation enable it to do a lubrication action so too.

[0016]The following technical matters are contained in this application.

[0017]Namely, a support plate of 1 which this application proposes in order to attain the above-mentioned purpose, In structure where a support plate and a notch plate serve as a different body, A flange which receives load of a support plate is used as metal (iron, non-iron), An oil lubrication groove required in order to carry out integral moulding of the resin (thermosetting resin, thermoplastics) to the metal and to slide with a mating member is formed by resin, As for the inside diameter side, resin is constituted from a resin layer or a resin layer + metal layer by continuation and thickness direction in a hoop direction, A through hole or unevenness was formed in the metal-fittings surface, it is characterized by having composition which makes resin placed between the portions, and an oilway which was penetrated to shaft orientations in

addition to the above-mentioned composition was formed.

[0018]The following contents are also included.

[0019]That is, in order to attain the above-mentioned purpose, a support plate of 1 which this application proposes uses as metal a flange which receives load of a support plate for the purpose of reduction of a flexure amount, and constitutes a periphery notch as a baffle with a stator here. If it is a baffle mechanism, it is possible by other specifications. An oil lubrication groove required in order to constitute and slide on a mating part and a field on which it slides by resin is formed. It will not limit, if it is the slot specification with which it is satisfied of performance about the shape of a quirk.

[0020]Combination of a metal plate and resin is made into insert molding, and, as for the inside diameter side, resin has composition of a resin layer or a resin layer + metal layer in a hoop direction at continuation and a thickness direction. A through hole or unevenness is formed in the metal-fittings surface, and a baffle mechanism by torque generated at the time of sliding consists of making resin placed between the portions. An undercut part which resin of a through hole or an uneven part clings to a slip off stop of resin, and is resisting to the directions of an omission, such as a taper or camfering, at resistance by power and also a through hole is provided in a metal department.

[0021]When resin is used as phenol resin and precision improvement of a sliding surface is taken into consideration as a gate system, its gate systems (a disk gate, a pin disk gate film, etc.) from a resin inner diameter part are desirable. It is good also in a pin gate from a sliding surface. Other thermosetting resin and thermoplastics are also possible for resin.

[0022>About a metal plate, they may be punching (SPCC, SPHC, etc.), such as sheet metal, or a forge, a sintered metal, aluminum, etc.

[0023]And according to the above-mentioned composition, it is possible to do the following operation effects so.

[0024]That is, by using as metal first a flange which receives load of a support plate, a flexure amount can be reduced, interference with a notch plate can be prevented and wear of a resin part which constitutes a plate and a pocket section of thin meat inserted in inside can be reduced.

[0025]By reducing bending, a mating part of a support plate and a actual touch area which slides can be increased, a coefficient of friction can be reduced, and wear can also be reduced.

[0026]By using structure of having an oil lubrication groove by integral moulding of a metal plate and resin, an axial dimension of a support plate can be shortened, and also it can contribute also to cost reduction. Although especially resin for sliding serves as a high cost compared with a general structural steel worker, since weight (the amount used) of resin can be reduced, there is a cost merit.

[0027]

[Embodiment of the Invention]Working example of this invention is described according to Drawings below.

[0028]Drawing 1 shows the front view of the support plate 11 concerning working example of this invention, and the A-O-A line sectional view is shown in drawing 2. Drawing 3 is a rear elevation of the support plate 11.

[0029]The support plate 11 concerning the working example concerned as one of the component parts of a notch type stator used for the torque converter of the automatic transmission for cars, etc., It is attached to the inside diameter side of a stator body, the notch plate of a one way clutch is supported pivotable between stator bodies, and it is constituted as follows.

[0030]That is, the annular flange 12 which receives thrust loading at the time of an operation is formed first, and this flange 12 is formed with the annular metal plate 13 which consists that whole of SPCC or SPHC. As for the required number (a figure 4 equidistant placement), the baffle part 14 of the letter of a notch for carrying out the baffle of the support plate 11 concerned to a stator body is formed in this flange 12 thru/or the outer periphery part of the metal plate 13.

[0031]Integral moulding of the resin molding part 15 which consists of phenol resin etc. is carried out to the axial end side and inner diameter surface of the above-mentioned flange 12 thru/or

the metal plate 13 by insert molding, and the mating member and the annular sliding part 16 which slides are formed of this resin molding part 15 at the time of an operation.

[0032]To the above-mentioned flange 12 thru/or the metal plate 13. As for the required number (a figure 20 equidistant placement), the through hole 17 penetrated to shaft orientations is formed, and the baffle of the resin molding part 15 thru/or the sliding part 16 is carried out to the flange 12 thru/or the metal plate 13 by filling up this through hole 17 with a part of resin molding part 15.

[0033]moreover -- the end face of its sliding part 16 among the resin molding parts 15 -- the oil lubrication groove 18 -- a required number (a figure 20 equidistant placement) -- it is provided radiately.

[0034]According to the support plate 11 of the above-mentioned composition, it is possible to do the following operation effects so.

[0035]Namely, since it is first formed with the annular metal plate 13 in which the annular flange 12 which receives thrust loading at the time of an operation consists the whole of SPCC or SPHC, The rigidity of the support plate 11 increases and the flexure amount generated in the support plate 11 is made to decrease. Therefore, since the support plate 11 can be prevented from interfering with a notch plate, Anomalous attrition can be prevented from the rotational resistance at the time of idling of a stator body becoming large, or occurring in the resin part near the pocket section of the light-gage plate inserted in the inside of a stator, or a stator body.

[0036]Since the flexure amount generated in the support plate 11 is reduced, the mating part of the support plate 11 and the actual touch area which slides can be increased, a coefficient of friction can be reduced, and wear can also be reduced.

[0037]Since the axial dimension of the support plate 11 can be shortened since the rigid high metal plate 13 is used for some thick support plates 11, and the amount of the expensive resin material for sliding used is reduced, the advantageous product also in cost can be provided.

[0038]Since the through hole 17 of a required number is formed in the flange 12 thru/or the metal plate 13 and this through hole 17 is filled up with a part of resin molding part 15, the baffle of the resin molding part 15 thru/or the sliding part 16 can be firmly carried out to the flange 12 thru/or the metal plate 13.

[0039]Since the oil lubrication groove 18 of the required number is radiately established in the sliding part 16 of the resin molding part 15, with the oil etc. which flow through this oil lubrication groove 18 at the time of an operation, the lubrication of the sliding part 16 can fully be carried out, a coefficient of friction can be reduced, and wear can also be reduced.

[0040]If the oilway 20 which carries out required number (figure 4 equidistant placement) formation of the breakthrough 19 penetrated to shaft orientations, and becomes the metal plate 13 and the resin molding part 15 which are put on shaft orientations from this breakthrough 19 is formed about this lubrication action as shown in drawing 4 and drawing 5, In order that a lot of oils may flow through this oilway 20 at the time of an operation, it is possible to improve lubrication performance, a cooling capability, etc.

[0041]

[Effect of the Invention]This invention does the following effects so.

[0042]Namely, in the support plate by Claim 1 of this invention first provided with the above-mentioned composition, Since integral moulding of the resin was carried out to this metal by using as metal the flange which receives the load of a support plate, it becomes possible to reduce the flexure amount generated in a support plate according to the rigid increase by having used metal. Therefore, since a support plate can be prevented from interfering with a notch plate, Anomalous attrition can be prevented from the rotational resistance at the time of idling of a stator body becoming large, or occurring in the resin part near the pocket section of the light-gage plate inserted in the inside of a stator, or a stator body.

[0043]Since the flexure amount generated in a support plate is reduced, the mating part of a support plate and the actual touch area which slides can be increased, a coefficient of friction can be reduced, and wear can be reduced.

[0044]Since the axial dimension of a support plate can be shortened since rigid high metal is

used for some thick support plates, and the amount of the expensive resin material for sliding used is reduced, the advantageous product also in cost can be provided.

[0045]A through hole or unevenness can be formed on the surface of metal, and the baffle of the resin can be firmly carried out to a sake to metal having made it make some resin intervene in this through hole or unevenness.

[0046]Since the oil lubrication groove required in order to slide with a mating member was formed by resin, with the oil etc. which flow through an oil lubrication groove at the time of an operation, the lubrication of the sliding part can fully be carried out, a coefficient of friction can be reduced, and wear can be reduced.

[0047]While forming with metal the flange which receives thrust loading in the support plate by Claim 2 of this invention provided with the above-mentioned composition at the time of an operation, a mating member and the sliding part which slides are formed with resin, Since integral moulding of the resin was carried out to metal, it becomes possible to reduce the flexure amount generated in a support plate according to the rigid increase by having used metal too. Therefore, since a support plate can be prevented from interfering with a notch plate, Anomalous attrition can be prevented from the rotational resistance at the time of idling of a stator body becoming large, or occurring in the resin part near the pocket section of the light-gage plate inserted in the inside of a stator, or a stator body.

[0048]Since the flexure amount generated in a support plate is made to decrease, the mating part of a support plate and the actual touch area which slides can be increased, a coefficient of friction can be reduced, and wear can be reduced.

[0049]Since the axial dimension of a support plate can be shortened since rigid high metal is used for some thick support plates, and the amount of the expensive resin material for sliding used is reduced, the advantageous product also in cost can be provided.

[0050]In addition, in the support plate by Claim 3 of this invention provided with the above-mentioned composition, Since the oil lubrication groove was radiately established in the end face of the sliding part formed with resin, with the oil etc. which flow through an oil lubrication groove at the time of an operation, the lubrication of the sliding part can fully be carried out, a coefficient of friction can be reduced, and wear can be reduced.

[0051]In the support plate by Claim 4 of this invention provided with the above-mentioned composition again, Since the oilway which forms the breakthrough penetrated to shaft orientations in the metal and resin which are put on shaft orientations, and becomes them from this breakthrough was provided, when a lot of oils flow through an oilway at the time of an operation, lubrication performance, a cooling capability, etc. can be improved.

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**DESCRIPTION OF DRAWINGS**

[Brief Description of the Drawings]

[Drawing 1]The front view of the support plate concerning working example of this invention

[Drawing 2]The A-O-A line sectional view in drawing 1

[Drawing 3]The rear elevation of the support plate

[Drawing 4]The front view of the support plate concerning other working example of this invention

[Drawing 5]The B-O-B line sectional view in drawing 4

[Drawing 6]The sectional view showing the mounting state of the support plate concerning a conventional example

[Description of Notations]

- 1 Stator
- 2 Stator body
- 2a Inside diameter step
- 3 Notch plate
- 4 and 11 Support plate
- 4a, 12 flanges
- 4b End face
- 4c Sliding surface
- 4 d Inner diameter part
- 5 Light-gage plate
- 6 Pocket section
- 13 Metal plate (metal)
- 14 Baffle part
- 15 Resin molding part (resin)
- 16 Sliding part
- 17 Through hole
- 18 Oil lubrication groove
- 19 Breakthrough
- 20 Oilway

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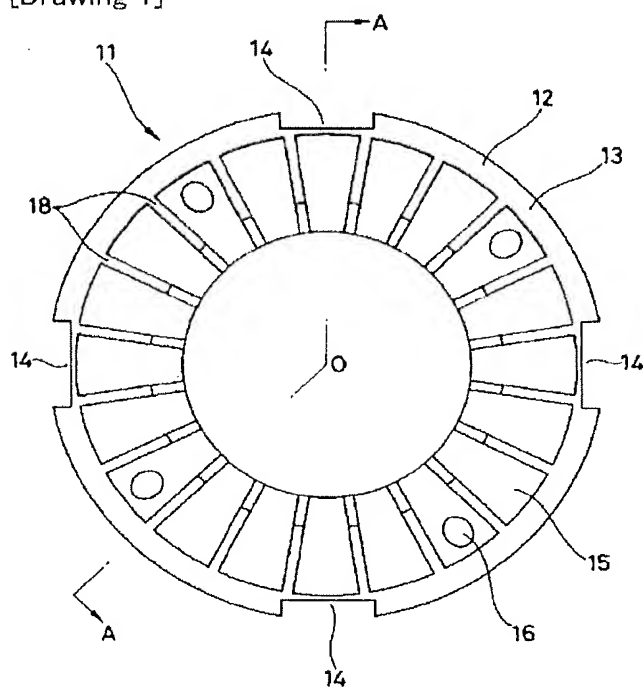
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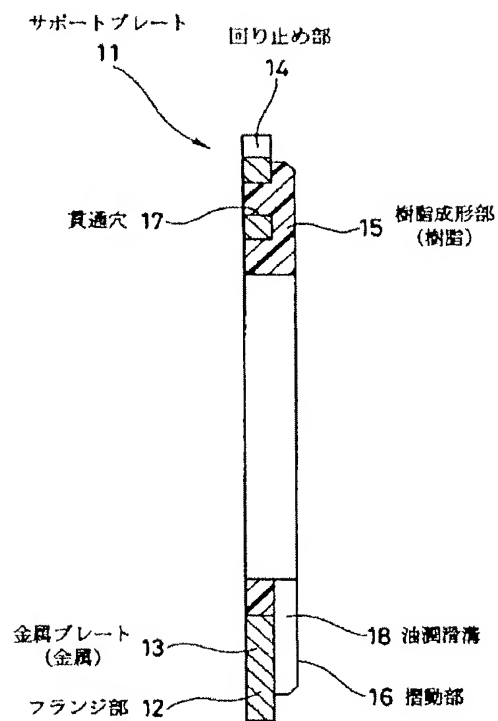
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DRAWINGS

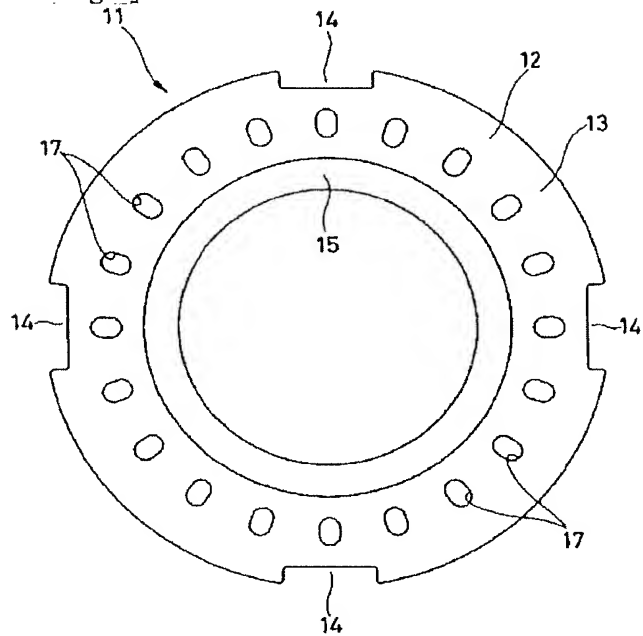
[Drawing 1]



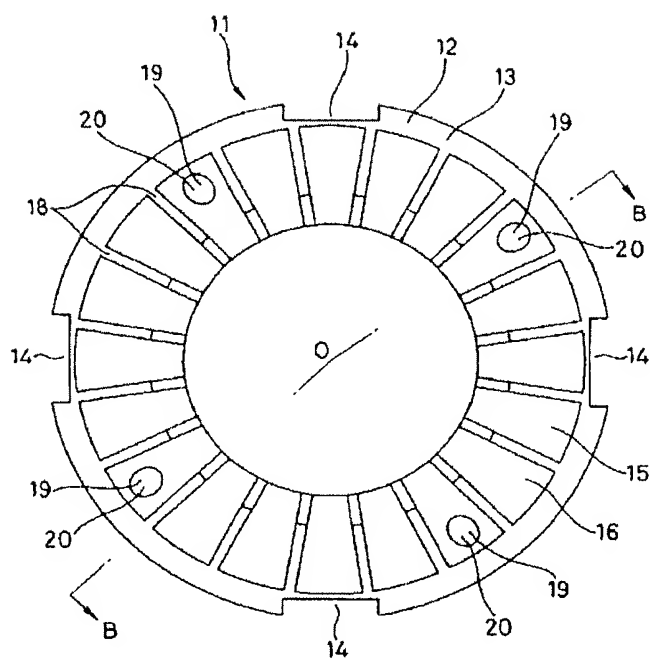
[Drawing 2]



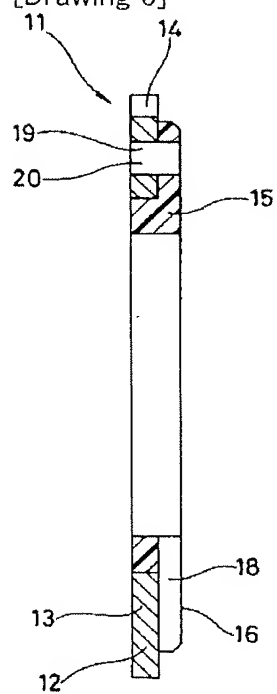
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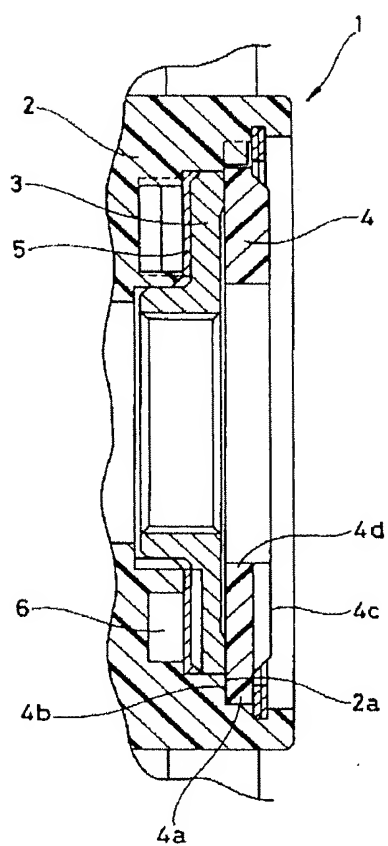
[Drawing 4]



[Drawing 5]



[Drawing 6]



[Translation done.]